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NOV 81 W E BADCOCK, D J LICHTENSTEIN

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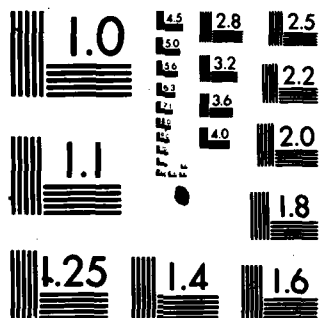


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AFFSE REPORT 2/81

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Department of Defence
Defence Science and Technology Organisation
Armed Forces Food Science Establishment
Scottsdale, Tasmania

AFFSE REPORT 2/81

Field Evaluation of Australian Ration Packs (U) Emergency Flying Ration

W. E. BADCOCK

and

D. J. LICHTENSTEIN

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DEPARTMENT OF DEFENCE
ARMED FORCES FOOD SCIENCE ESTABLISHMENT

AFFSE REPORT 2/81

FIELD EVALUATION OF AUSTRALIAN
RATION PACKS

EMERGENCY FLYING RATION (U)

W.E. Badcock and D.J. Lichtenstein

ABSTRACT

Troop feeding trials were conducted to determine the consumer acceptability and Service suitability of the Emergency Flying Ration packs on issue to Australian Servicemen.

These trials were superimposed upon combat survival courses which were conducted by the Royal Australian Air Force.

Results obtained indicated that, although the ration packs are generally satisfactory, implementation of the recommended changes should produce further improvements. (U)

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FIELD EVALUATION OF AUSTRALIAN RATION PACKS

Emergency Flying Ration

W. E. Badcock and D. J. Lichtenstein

INTRODUCTION

Following attendance at Combat Survival (COMSURV) Course Number 124 by one of the authors (DJL), it was recommended that questionnaires be incorporated as a regular part of the training course (Lichtenstein 1976). Accordingly, all students who attend COMSURV courses complete a questionnaire on the Emergency Flying Ration (EFR) after using it.

This report details results from users drawn from all three Service arms, but predominantly from the Royal Australian Air Force.

THE EVALUATION

The current format of the questionnaire card is set out at Appendix A. The questionnaire provides a scale for the respondent to rate the acceptability and Service suitability of each ration component. These scores were analysed using a Hewlett-Packard 9825 programmable calculator.

The acceptability of food items was estimated on a five point hedonic rating scale with the range extending from -2 to +2; the ends of the scale corresponding to the "Dislike Very Much" and "Like Very Much" categories respectively, with a neutral midpoint of 0 signifying "Neither like nor Dislike". From these data the mean acceptability scores and 'standard deviation' were calculated. Although the distribution cannot be normal (they are bounded and many are skew) the standard deviation was calculated by the usual formula to indicate the spread of user opinion. Results other than the average acceptability were converted to percentages; for example those respondents returning scores of -2 and -1 were grouped together to give an overall figure for "Percent Dislike". These figures have been used to find the order of preference of food items and sundries, which have been listed in decreasing order of acceptability.

These results were further analysed to determine whether COMSURV course, Service affiliation or marital status had any influence on the food preferences.

Additionally, the questionnaire provides a section for user comments, so that subjects could amplify low ratings given to items, as well as providing an opportunity for suggesting improvements in the light of practical user experience with the ration. The most frequent responses have been categorised.

RESULTS AND DISCUSSION

Analysis of Data

From the overall data presented in Tables 1-5, it is evident that "Instant Coffee", "Beef Block", and "Milk Powder" are unacceptable — being disliked respectively by 26%, 33% and 41% of all users. Furthermore, the preference ratings of these three items were consistently the lowest among all three Service arms.

There is no evidence that the Service affiliation or marital status of the participants had any effects on the acceptability of food items. While the differences between COMSURV courses are significant at the 5% probability level, it is not considered that this has any significance for the design of the EFR.

The bar charts in Figure 1 indicate the relative numbers of respondents who replied to the food questionnaires with each of the five acceptability ratings provided on the questionnaire. Furthermore, they serve to indicate the spread of opinion in regard to acceptability. The spread of replies is greater with the less acceptable ration items. This seems to be related to a reluctance on the part of some, but not all subjects to downgrade the rating of the food supplied. This has been reported previously (Badcock and Lichtenstein, 1978).

User Comments

The full analysis of user complaints and comments would have been unwieldy to be incorporated in a report of this size. Nevertheless the major sources of complaints are included as well as the main suggestions for improvement.

The complaints are of interest as they confirm the ratings contained in Table 4, showing coffee, beef block, and milk powder as being the least popular food items in the ration. Additionally, the water-food bag was of inadequate strength; the sweet wrappers stuck to the sweets; the matches were less than ideal ("book" matches were included in the rations used in the courses studied); the toilet paper was inadequate; the *Afss* water sterilising tablets were unpopular because of the taste imparted to the water; and the packaging was considered both excessive and difficult to open.

Generally useful comments for improvements other than the correction of previously mentioned faults include:

- (a) Replacing some or all of the coffee with tea.
- (b) Reducing the amount of packaging.
- (c) Improving or replacing the beef block.
- (d) Providing more rubber bands, salt, soup cubes, and sugar.

On the other hand, requests for items such as "Glucodin", saccharin, "vitamin tablets", "protein concentrates", or canned foods indicate that some users lack the nutritional training required to maximise the likelihood of their ability to endure a real survival situation.

RECOMMENDATIONS

The following changes to the ration are recommended:

- (a) That the milk powder be replaced either with condensed milk or with "instant" milk powder.
- (b) That efforts be made to add extra flavour to the beef block.
- (c) That some of the coffee be replaced with tea.
- (d) That a stronger, more durable plastic be used for the water-food bag and that an additional smaller bag be included as well.
- (e) That holes be drilled in the lid of the container so that it can be used with the handles as a frying pan.
- (f) That the use of "Greenlite" or similar matches be continued.
- (g) That an extra rubber band be included.
- (h) That a razor blade be included.

It is also recommended that elementary training in food and nutrition be provided in the COMSURV course.

It is further recommended that special EFRs be packed incorporating recommendations (a) to (h) above and trialled on a future COMSURV course shortly after packing.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the assistance of the course members and their instructors for providing completed questionnaires, and Mr. D. R. Waters for assistance with the analysis.

REFERENCES

- Badcock, W.E. and Lichtenstein, D.J. (1978) AFFSE Report 4/78.
Lichtenstein, D.J. (1976) AFFSE Minor Report MR/122.

APPENDIX A

Course Number

*Armed Forces Food Science Establishment
Scottsdale, Tasmania*

EMERGENCY FLYING RATION

USER QUESTIONNAIRE

1. As a consumer of the rations you are in the best position to advise us on any changes that should be made.
2. Please complete this questionnaire by recording your *honest* reactions.
3. All answers will be treated as confidential.

Name and Rank

Service Branch

Age

Married ☐

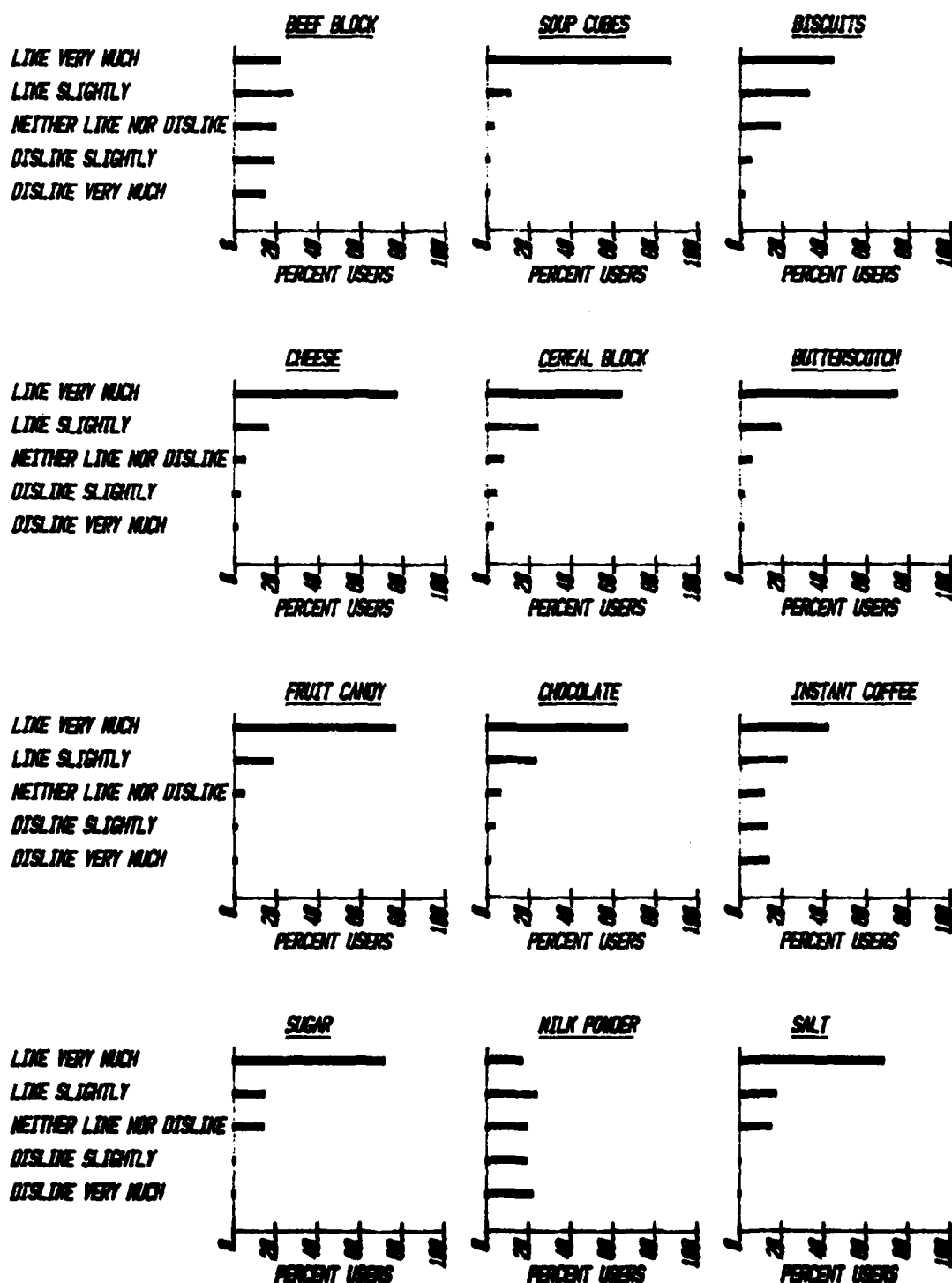
Single ☐

Years of Service

FIGURE 1

GRAPHIC PRESENTATION OF INDIVIDUAL ACCEPTABILITIES

EMERGENCY FLYING RATION All Courses Combined



FOOD ITEMS

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SUNDRIES

[illegible]

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TABLE 1
EMERGENCY FLYING RATION QUESTIONNAIRE RESULTS
NAVY

No. of Subjects = 134 Average Age = 23.8 (SD = 4.7) Av Yrs Service = 6.0 (SD = 5.0)
% Married = 39.6

FOOD ITEMS	ACCEPTABILITY					PACKAGING				
	Acceptability Score		%Dis-like	%Not tried	%Not replied	%All right	%Too shiny	%Too crackly	%Too flimsy	%Not replied
	Mean	S.D.								
Beef Block	0.48	1.29	22	4	1	70	4	1	0	3
Soup Cubes	1.71	0.68	2	0	0	70	4	0	2	3
Biscuits	1.11	0.88	4	0	1	71	4	0	1	3
Cheese	1.52	0.91	5	1	1	72	5	0	0	2
Cereal Block	1.40	0.95	8	2	0	72	4	0	0	3
Butterscotch	1.69	0.68	2	1	0	69	4	2	0	2
Fruit Candy	1.54	0.80	3	0	0	62	5	4	5	2
Chocolate	1.55	0.78	2	0	1	72	3	1	1	3
Instant Coffee	0.77	1.46	27	4	0	72	4	1	0	2
Sugar	1.56	0.77	0	1	0	72	4	1	0	3
Milk Powder	0.04	1.42	36	4	0	72	4	1	0	3
Salt	1.52	0.76	0	3	0	71	4	0	2	2

Overall Average = 1.24

SUNDRIES	% Satisfactory	% Unsatisfactory	Not Replied
Afses	78	10	13
Chloroquine	48	3	49
Matches	70	25	5
Toilet Paper	64	27	9
Spoon-opener	98	2	0
Instruction Sheet	90	7	3
Water/Food bag	75	25	1
Rubber Band	81	13	7
Container	96	4	0

PREFERENCE RATINGS

FOOD ITEMS				SUNDRIES	
Acceptabilities	(Mean Score)	Dislikes	(% Users)	(% Satisfactory)	
Soup Cubes	1.7	Sugar	0	Spoon-opener	98
Butterscotch	1.7	Salt	0	Container	96
Sugar	1.6	Soup Cubes	2	Instruction Sheet	90
Salt	1.5	Butterscotch	2	Rubber Band	81
Chocolate	1.5	Chocolate	2	Afses	78
Fruit Candy	1.5	Fruit Candy	3	Water/Food bag	75
Cheese	1.5	Biscuits	4	Matches	70
Cereal Block	1.4	Cheese	5	Toilet paper	64
Biscuits	1.1	Cereal Block	8	Chloroquine	48
Instant Coffee	0.8	Beef Block	22		
Beef Block	0.5	Instant Coffee	27		
Milk Powder	0.0	Milk Powder	36		

TABLE 2
EMERGENCY FLYING RATION QUESTIONNAIRE RESULTS
ARMY

No. of Subjects = 28 Average Age = 24.5 (SD = 3.8) Av Yrs Service = 5.9 (SD = 3.9)
% Married = 60.7

FOOD ITEMS	ACCEPTABILITY					PACKAGING				
	Acceptability Score		%Dis-like	%Not tried	%Not replied	%All right	%Too shiny	%Too crackly	%Too flimsy	%Not replied
	Mean	S.D.								
Beef Block	-0.15	1.29	48	4	0	82	11	0	0	0
Soup Cubes	1.79	0.50	0	0	0	86	7	0	4	0
Biscuits	0.86	1.11	11	0	0	86	11	0	0	0
Cheese	1.39	1.07	7	0	0	93	4	0	0	0
Cereal Block	1.48	0.75	4	4	0	86	11	0	0	0
Butterscotch	1.11	1.23	14	0	0	82	4	11	0	0
Fruit Candy	1.46	1.07	7	0	0	82	4	11	0	0
Chocolate	1.61	0.57	0	0	0	86	7	4	0	0
Instant Coffee	0.56	1.58	33	4	0	93	4	0	0	0
Sugar	1.64	0.68	0	0	0	93	4	0	0	0
Milk Powder	-0.33	1.47	56	4	0	93	4	0	0	0
Salt	1.79	0.57	0	0	0	89	4	0	4	0

Overall Average = 1.10

SUNDRIES	%Satisfactory	%Unsatisfactory	Not Replied
Afses	71	14	14
Chloroquine	43	4	54
Matches	71	29	0
Toilet paper	75	14	11
Spoon-opener	96	0	4
Instruction Sheet	89	4	7
Water/Food bag	86	11	4
Rubber Band	89	7	4
Container	96	4	0

PREFERENCE RATINGS

FOOD ITEMS				SUNDRIES	
Acceptabilities	(Mean Score)	Dislikes	(% Users)	(% Satisfactory)	
Soup Cubes	1.8	Soup Cubes	0	Spoon-opener	96
Salt	1.8	Salt	0	Container	96
Sugar	1.6	Sugar	0	Rubber Band	89
Chocolate	1.6	Chocolate	0	Instruction Sheet	89
Cereal Block	1.5	Cereal Block	4	Water/Food bag	86
Fruit Candy	1.5	Fruit Candy	7	Toilet paper	75
Cheese	1.4	Cheese	7	Afses	71
Butterscotch	1.1	Biscuits	11	Matches	71
Biscuits	0.9	Butterscotch	14	Chloroquine	43
Instant Coffee	0.6	Instant Coffee	33		
Beef Block	-0.1	Beef Block	48		
Milk Powder	-0.3	Milk Powder	56		

TABLE 3
EMERGENCY FLYING RATION QUESTIONNAIRE RESULTS
RAAF

No. of Subjects = 369 Average Age = 24.2 (SD = 5.7) Av Yrs Service = 5.3 (SD = 4.1)
% Married = 39.8

FOOD ITEMS	ACCEPTABILITY					PACKAGING				
	Acceptability Score		% Dis-like	% Not tried	% Not replied	% All right	% Too shiny	% Too crackly	% Too flimsy	% Not replied
	Mean	S.D.								
Beef Block	0.15	1.36	36	5	0	80	2	1	2	2
Soup Cubes	1.87	0.41	0	1	0	78	2	1	4	3
Biscuits	1.14	0.97	7	1	0	79	2	1	4	3
Cheese	1.71	0.63	2	1	0	79	3	1	1	3
Cereal Block	1.42	0.93	6	3	0	80	2	1	2	3
Butterscotch	1.67	0.64	1	1	0	76	2	4	2	3
Fruit Candy	1.73	0.59	1	0	1	72	2	5	5	3
Chocolate	1.48	0.88	6	0	0	78	3	1	2	3
Instant Coffee	0.63	1.44	25	4	0	78	2	2	2	3
Sugar	1.55	0.78	1	1	0	79	1	1	3	3
Milk Powder	-0.06	1.39	41	4	0	77	2	1	4	3
Salt	1.51	0.76	0	2	0	78	2	1	4	3

Overall Average = 1.23

SUNDRIES	% Satisfactory	% Unsatisfactory	Not Replied
Afses	82	7	11
Chloroquine	60	8	33
Matches	69	27	4
Toilet paper	64	29	7
Spoon-opener	96	3	1
Instruction Sheet	88	7	5
Water/Food bag	70	28	2
Rubber Band	85	10	5
Container	92	5	2

PREFERENCE RATINGS

FOOD ITEMS				SUNDRIES	
Acceptabilities	(Mean Score)	Dislikes	(% Users)	(Satisfactory)	
Soup Cubes	1.9	Soup Cubes	0	Spoon-opener	96
Fruit Candy	1.7	Salt	0	Container	92
Butterscotch	1.7	Fruit Candy	1	Instruction Sheet	88
Cheese	1.7	Butterscotch	1	Rubber Band	85
Salt	1.5	Sugar	1	Afses	82
Sugar	1.5	Cheese	2	Water/Food bag	70
Chocolate	1.5	Chocolate	6	Matches	69
Cereal Block	1.4	Cereal Block	6	Toilet paper	64
Biscuits	1.1	Biscuits	7	Chloroquine	60
Instant Coffee	0.6	Instant Coffee	25		
Beef Block	0.1	Beef Block	36		
Milk Powder	-0.1	Milk Powder	41		

TABLE 4
EMERGENCY FLYING RATION QUESTIONNAIRE RESULTS
TOTAL

No. of Subjects = 531 Average Age = 24.1 (SD = 5.3) Av Yrs Service = 5.5 (SD = 4.4)
% Married = 40.9

FOOD ITEMS	ACCEPTABILITY					PACKAGING				
	Acceptability Score		%Dis-like	%Not tried	%Not replied	%All right	%Too shiny	%Too crackly	%Too flimsy	%Not replied
	Mean	S.D.								
Beef Block	0.22	1.35	33	5	1	77	3	1	2	2
Soup Cubes	1.82	0.50	1	1	0	76	3	1	4	3
Biscuits	1.11	0.96	6	1	0	77	3	1	3	3
Cheese	1.65	0.74	3	1	0	78	4	1	1	3
Cereal Block	1.42	0.93	6	3	0	78	3	1	1	3
Butterscotch	1.64	0.70	2	1	0	75	3	4	2	3
Fruit Candy	1.67	0.69	2	0	0	70	3	5	5	3
Chocolate	1.50	0.84	5	0	0	77	3	1	2	3
Instant Coffee	0.66	1.45	26	4	0	77	2	2	2	3
Sugar	1.56	0.77	1	1	0	78	2	1	2	3
Milk Powder	-0.05	1.40	41	4	0	77	3	1	2	3
Salt	1.53	0.75	0	2	0	77	2	1	3	3

Overall Average = 1.23

SUNDRIES	%Satisfactory	%Unsatisfactory	Not Replied
Afses	80	8	12
Chloroquine	56	6	38
Matches	70	27	4
Toilet paper	65	28	7
Spoon-opener	96	3	1
Instruction Sheet	88	7	5
Water/Food bag	72	26	2
Rubber Band	84	11	5
Container	93	5	2

PREFERENCE RATINGS

FOOD ITEMS				SUNDRIES	
Acceptabilities	(Mean Score)	Dislikes	(% Users)	(% Satisfactory)	
Soup Cubes	1.8	Salt	0	Spoon-opener	96
Fruit Candy	1.7	Soup Cubes	1	Container	93
Sugar	1.6	Sugar	1	Instruction Sheet	88
Butterscotch	1.6	Fruit Candy	2	Rubber Band	84
Cheese	1.6	Butterscotch	2	Afses	80
Salt	1.5	Cheese	3	Water/Food bag	72
Chocolate	1.5	Chocolate	5	Matches	70
Cereal Block	1.4	Cereal Block	6	Toilet paper	65
Biscuits	1.1	Biscuits	6	Chloroquine	56
Instant Coffee	0.7	Instant Coffee	26		
Beef Block	0.2	Beef Block	33		
Milk Powder	-0.1	Milk Powder	41		

TABLE 5

EMERGENCY FLYING RATION SUMMARY RESULTS BY COMSURY COURSES

Comsury Course	124	125	127	133	134	135	137	138	142	144	145	146	148	149	150	151	154	155	158	159	160	161	162	Overall
SUBJECTS																								
No. Subjects	19	37	15	20	30	21	21	20	18	15	23	27	21	19	24	17	32	28	19	22	25	28	30	531
Average Age	22.9	23.8	24.2	24.7	24.2	25.0	25.2	23.6	21.6	27.7	24.6	22.3	25.1	24.5	23.6	26.1	22.9	22.4	25.5	23.7	27.0	24.1	23.4	24.1
Av. yrs. Svce.	4.4	5.4	5.4	6.5	5.9	5.8	6.8	5.4	3.4	9.1	6.3	4.3	6.8	6.3	5.0	7.9	4.2	4.6	7.3	4.9	5.0	5.3	4.8	5.5
% Married	26.3	40.5	66.7	35.0	53.3	52.4	66.7	55.0	5.6	40.0	47.8	18.5	52.4	36.8	50.0	64.7	31.3	25.0	47.4	31.8	36.0	35.7	40.0	40.9
ACCEPTABILITY																								
Beef Block	0.4	0.1	0.7	-1.0	-0.4	0.2	1.0	-0.5	0.2	0.1	1.0	0.8	1.0	0.5	0.2	-0.1	-0.1	0.2	0.9	-0.3	0.6	0.3	-0.1	0.2
Soup Cubes	1.2	1.7	1.7	1.9	1.9	2.0	1.8	1.9	1.8	1.9	2.0	2.0	2.0	1.8	1.9	1.9	1.7	1.8	1.9	1.7	1.9	1.7	1.8	1.8
Biscuits	0.8	1.1	1.5	1.4	1.0	0.9	1.1	0.9	0.9	1.3	1.0	1.3	0.9	1.7	1.1	1.5	0.7	1.0	1.5	1.5	1.2	1.2	0.9	1.1
Cheese	1.7	1.8	1.7	1.9	1.2	1.9	1.9	1.6	1.7	1.9	1.4	1.5	1.5	1.9	1.1	1.9	1.4	1.6	1.6	1.8	1.8	1.7	1.9	1.6
Cereal Block	1.7	1.3	1.5	1.3	1.6	1.0	1.6	1.7	1.9	1.5	1.8	1.3	1.3	1.5	0.7	1.5	1.2	1.8	1.4	1.6	1.1	1.3	1.3	1.4
Butterscotch	1.7	1.5	1.5	1.8	2.0	1.9	1.9	1.6	1.9	1.9	1.7	1.7	1.8	1.8	1.9	1.6	1.4	1.4	1.6	1.5	1.5	1.4	1.6	1.6
Fruit Candy	1.4	1.5	1.4	1.9	1.5	1.6	1.8	1.1	1.9	1.9	1.7	1.8	1.8	1.8	1.9	1.6	1.8	1.7	1.7	1.5	1.8	1.5	1.8	1.7
Chocolate	1.8	1.4	1.7	1.4	1.5	1.0	1.3	1.5	1.3	1.9	1.4	1.5	1.5	1.6	0.9	1.8	1.4	1.7	1.8	1.5	1.5	1.5	1.6	1.5
Inst. Coffee	1.4	0.8	1.2	1.1	0.3	1.2	0.3	0.0	-0.3	0.9	0.2	1.0	-0.4	1.6	0.2	1.6	0.6	0.6	-0.5	0.8	0.8	1.1	0.8	0.6
Sugar	1.7	1.7	1.6	1.7	1.7	1.6	1.6	1.4	1.9	1.8	1.5	1.7	1.5	1.8	1.1	1.7	1.5	1.4	1.3	1.6	1.4	1.6	1.4	1.6
Milk Powder	0.5	0.2	-0.5	-0.8	-0.6	-0.0	-0.1	0.2	-0.6	-0.6	-0.1	-0.9	0.7	0.8	-0.1	0.4	-0.1	0.6	-1.1	0.2	-0.2	0.5	0.1	-0.0
Salt	1.4	1.5	1.5	1.8	1.9	1.9	1.5	1.9	1.8	1.7	1.7	1.7	1.6	1.7	1.1	1.5	1.4	1.1	1.3	1.4	1.4	1.1	1.4	1.5
Course Avge.	1.3	1.2	1.3	1.2	1.1	1.3	1.3	1.1	1.2	1.4	1.3	1.3	1.3	1.6	1.0	1.4	1.1	1.2	1.1	1.2	1.2	1.2	1.2	1.2

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